

Chapter 6 Strategic Options

6.1 INTRODUCTION

The Land Transport Act requires the Regional Land Transport Strategy to “identify land transport outcomes sought by the region and the strategic options for achieving those outcomes”. Auckland’s land transport outcomes are identified in Chapter 4. This chapter outlines the strategic options for achieving those outcomes, and the process that has been followed to select them. It also sets out the general policies required to implement the preferred strategic option. This Regional Land Transport Strategy assumes continued regional growth under all strategic options.

6.2 DEVELOPMENT OF STRATEGIC OPTIONS

For the purpose of this strategy, strategic options have been defined as high-level combinations of investment in three main areas: roads, public transport and travel demand management. This includes both infrastructure development and service provision.

The strategic options have been developed to meet the Land Transport Act’s requirement for the Regional Land Transport Strategy to “take into account the land transport funding likely to be available within the region during the period covered by the strategy”. This requirement has had an important bearing on the way the strategic options have been developed, by ensuring that each of the options considered is affordable within the expected funding available.

An assessment of likely available funding sources indicates that approximately \$11 billion will be available to fund transport in the Auckland region over the next 10 years¹, as shown in Table 6.1.

¹ For details see Technical Paper 12 this was developed before the announcement of the additional funding being announced. Note that these amounts are indicative, and subject to change as expenditure programmes are firmed up in future. They have been used for the purpose of defining strategic options for evaluation, and do not necessarily represent the amount of funding that will be required or allocated to the region in future.

Table 6.1: Expected land transport funding over next 10 years (\$million)

Income source	\$million
Territorial authorities	
• New works	740
• Road Maintenance and renewals	940
ARC	
• Rates (LTFS)	990
• ARH (existing IA LTFS)	680
Total, local sources	3,350
Tolling (Penlink & Northern Motorway extension)	180
Land Transport NZ national allocation	
• New works (Capex)	3,480
• Road maintenance & renewals	1,750
• Passenger transport subsidy (Opex)	650
Land Transport NZ regional allocation	1,580
Total, Land Transport NZ	7,460
TOTAL	10,990

The provision for additional funds to be raised through tolling is restricted to projects currently proposed to be at least partly funded by tolls under current legislation. During the 10 year period of this strategy, other projects may be identified which can be tolled, or legislation may be changed to allow tolling of corridors rather than projects only. If either of the possibilities arise, additional funds would be available, and a larger programme could be funded.

Since the preparation of the Draft Strategy the Government announced an additional \$330m would



be available for transport in Auckland – with \$280m allocated for State Highways and \$50m for rail infrastructure. This has been included in the Strategy.

Not included is the potential additional debt funding of state highway projects from tolls income that was announced by Transit NZ in its 05/06 State Highway Plan. As this source of funding is subject to community support for toll projects, there is considerable uncertainty regarding the level of additional funding that could be generated from this source.

Also not included in the strategy is the potential additional funding arising from the Government's 05/06 Budget announcement of an increase in national transport funding of \$100m per year for three years from 06/07. It is not clear at this stage what Auckland's share is of this funding allocation.

Working within this funding constraint, a series of strategic options was developed. As a starting point, some measures were identified as being common to all options. They include:

- Maintenance and renewal of the road system
- Investment in traffic management to improve the operational efficiency of the regional arterial road network
- Investment targeted at improving road safety to achieve the regional target of fewer than 670 road deaths plus hospitalisations per year by 2010.

These measures are considered necessary to ensure the safe, efficient and effective performance of the existing transport system before any further improvements are considered. In effect, these measures are assumed to have "first call" on the available funds. A separate process was adopted to determine the appropriate level of expenditure on

these items.² Arising from this, the following nominal allocations were made over the 10-year period:

• Maintenance and renewal of the road system	\$2,830 million
• Traffic management	\$200 million
• Road safety	\$510 million
Total:	\$3,540 million

With the remaining funds³, a set of strategic options was developed to test different combinations of demand management, roading and public transport measures. The options combine different packages of "low", "medium" or "high" investments in demand management and public transport. The options are described in Table 6.2, and the funding allocations are illustrated in Figure 6.1.

The "low" packages for public transport and demand management represent a continuation of current and committed levels of expenditure in these areas. The "medium" and "high" packages represent progressive increases in activity, as described in Table 6.2

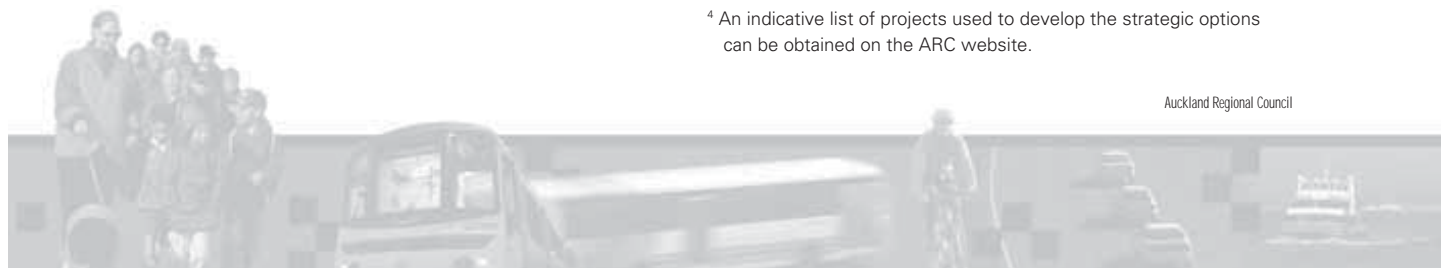
For roading, the "high" level of expenditure in Option 1 represents the amount that would be available for roading if the "low" level of activity was maintained for both public transport and demand management. This represents approximately \$5.3 billion of capital expenditure on roading infrastructure over the 10-year period. The other strategic options (Options 2-6) have progressively lower amounts of roading expenditure, determined by the amount of funds available within the funding constraint.

To enable an assessment of the likely impacts of the various strategic options, it was necessary to determine a set of indicative projects⁴ for each of

² As detailed in Technical Reports 13, 27 and 19 respectively.

³ The funding at the time the options were developed was \$10.7B. After the draft strategy was released additional funding was allocated for Auckland transport. This funding was not used in the option development

⁴ An indicative list of projects used to develop the strategic options can be obtained on the ARC website.



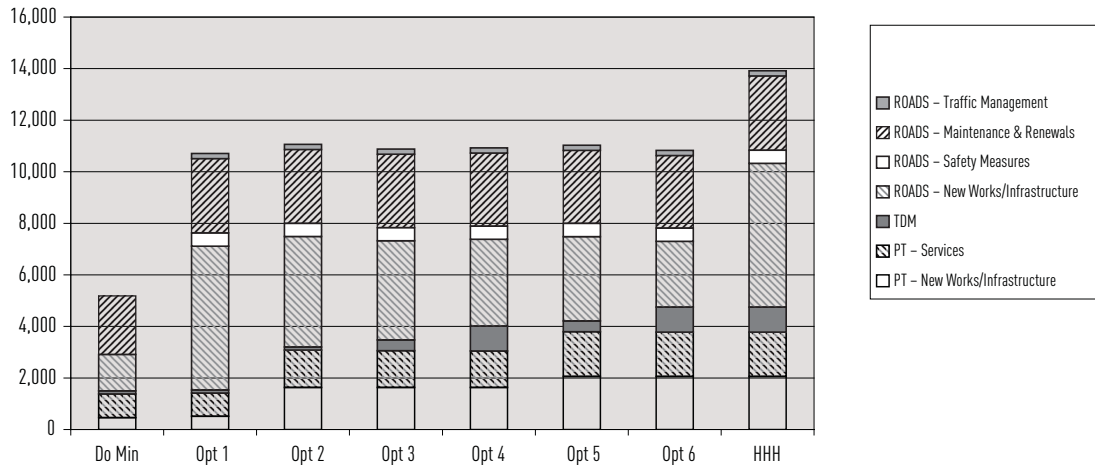


Figure 6.1 Strategic options: Allocation of expenditure (10 years, \$m)

the road, public transport and demand management packages⁵. It is important to recognise that these packages were indicative only, and do not assign any priority to or between individual projects.

In developing the packages, the most recent cost estimates were used, but these may be subject to change as projects become better defined. While a contingency allowance has been included for each of the options, the estimates do not allow for any increases in costs that may arise from the increased level of construction activity, or the so-called “buildability constraint”.

Because of the financial constraint, it is not possible to fund the highest level of activity in each of the road, public transport and demand management categories. Note that it is also not possible to fully fund all of the roading projects currently being promoted in the region within the financial constraint, even under the “high” roading option. It will, therefore, be necessary to assess the trade-offs between different levels of investment.

For the purposes of evaluation, however, a hypothetical “high-high-high” option was assessed. This includes a combination of high roads, high public transport and high demand management. Note that the estimated cost of this combination is approximately \$2.9 billion more than the total amount estimated to be available over the next 10 years.

A “do minimum” option was also developed for the purposes of evaluation. This represents a continuation of current expenditure for roading, public transport and travel demand management together with committed projects. Although higher than historical expenditure levels, the “do minimum” does not utilise all of the likely available funding identified above.

None of the strategic options include provision for road pricing other than the implementation of tolls for specific new roads where tolling is considered to be practicable under current legislation (e.g. Northern Motorway extension and Penlink). Although it is expected that the introduction of a wider system of road pricing would have a significant impact on land transport outcomes in the region, the nature of these impacts is very dependent on the type of pricing system that is chosen. The implementation of road pricing would also require legislative change.

⁵ These are described in detail in Technical Paper 20.



Table 6.2: General description of strategic options⁶

Option	Travel Demand Management (TDM)	Public Transport (PT)	Roads ⁷
Do Minimum	Low (\$120m): Current level of TDM expenditure maintained.	Low (\$1,380m): Existing service levels & expenditure continue.	Low (\$3,680m): Committed level of road expenditure only
1	Low (\$120m): Current level of TDM expenditure maintained.	Low (\$1,370m): Existing service levels & expenditure continue, with additional service capacity added only where demand requires.	High (\$8,890m): Allows the commencement and most cases completion of the regions identified strategic network improvements. ⁸
2	Low (\$120m): Current level of TDM expenditure maintained.	Medium (\$3,030m): Service levels boosted with at least 10-15 peak min services in key PT corridors, 25% QTN ⁹ bus priority lanes and network priority measures, some station and terminal upgrades. Adequate capacity to meet expected demand.	Medium-High (\$7,580m): Allows completion of approximately 80% of the regions identified strategic network improvements.
3	Medium (\$420m): TDM activity boosted to include: <ul style="list-style-type: none"> • Extensive school travel plans • Some community and work based travel plans • 50% regional cycle network • Improvements in walkability in 16 town centres. 	Medium (\$3,010m): Service levels boosted with at least 10-15 peak min services in key PT corridors, bus priority lanes on about 25% of the QTN and network priority measures, upgrade of key stations/ terminals /interchanges. Adequate capacity to meet expected demand.	Medium (\$7,130m): Allows completion of approximately 70% of the region's identified strategic network improvements.
4	High (\$970m): Major increase in TDM activity: <ul style="list-style-type: none"> • School travel plans for all schools • Extensive community and work based travel plan • Complete regional cycle network • Improvements in walkability in 45 town centres. 	Medium (\$3,000m): Service levels boosted with at least 10-15 peak min services in key PT corridors, bus priority lanes on about 25% of the QTN and network priority measures, upgrade of key stations/ terminals /interchanges. Adequate capacity to meet expected demand.	Medium (\$6,630m): Allows completion of approximately 65% of the region's identified strategic network improvements.

⁶ Indicative package costs are for 10 years and were based on the \$10.7 billion dollars funding identified during the option development and evaluation stage of the process. For a more detailed description of the options and their costing, refer to Technical Papers 13 and 15.

⁷ Includes costs of the following roading measures that are common to all options:

- | | |
|--|----------|
| • Maintenance & Renewal of road system | \$2,700m |
| • Traffic Management | \$200m |
| • Road Safety | \$510m |

⁸ The strategic roading network is described and illustrated in chapter 7.

⁹ QTN – Quality transit network is described and an indicative network is illustrated in chapter 7.



Table 6.2 continued

Option	Travel Demand Management (TDM)	Public Transport (PT)	Roads ⁷
5	Medium (\$420m): TDM activity boosted to include: <ul style="list-style-type: none"> • Extensive school travel plans • Some community and work based travel plans • 50% regional cycle network • Improvements in walkability in 16 town centres. 	High (\$3,750m): Further increases in service levels above medium to lead demand, and additional infrastructure to increase system capacity and priority on about 50% of the QTN; increased cross-town capacity, bus priorities, and bus-rail linkages.	Base plus (\$6,540m): Allows completion of approximately 63% of the region's identified strategic network improvements.
6	High (\$970m): Major increase in TDM activity: <ul style="list-style-type: none"> • School travel plans for all schools • Extensive community and work based travel plans • Complete regional cycle network • Improvements in walkability in 45 town centres. 	High (\$3,730m): Further increases in service levels above medium to lead demand, and additional infrastructure to increase system capacity and priority on about 50% of the QTN; increased cross-town capacity, bus priorities, and bus-rail linkages.	Base (\$5,800m): Allows completion of approximately 50% of the region's identified strategic network improvements.
"High-High-High"	High (\$970m): Major increase in TDM activity, as described in Option 6.	High (\$3,730m): Further increases in service levels, as described in Option 6.	High (\$8,890m): Allows the commencement and most cases completion of the region's identified strategic network improvements.

6.3 EVALUATION OF OPTIONS

The strategic options outlined above were assessed against a range of evaluation criteria, which relate to the objectives identified in Chapter 4. The evaluation criteria are shown in Table 6.3.

The evaluation used outputs from the Auckland Regional Transport model and the Auckland Passenger Transport model, the Ministry of Health Deprivation Index, and air emission models. This was supplemented by expert assessments for those criteria, which did not yield quantitative data. The model outputs were based on 2016 land use projections, and data for the peak and inter-peak periods was generated.



Table 6.3 Criteria for evaluation of strategic options

Objective	Evaluation criteria
Assisting economic development	<ul style="list-style-type: none"> • Access to employment • Accessibility to, between and within key economic and knowledge centres • Average transport user costs • Reliability • Ability to travel when required.
Assisting safety and personal security	<ul style="list-style-type: none"> • Accidents, injuries and deaths • Actual and perceived levels of security • Effect on vulnerable users
Improving access and mobility	<ul style="list-style-type: none"> • Connectivity: walk and cycle • Availability of travel choices to key destinations • General accessibility • Impact on those without access to a car • Transport affordability • Transport opportunities for the disabled.
Protecting and promoting public health	<ul style="list-style-type: none"> • Share of trips by active modes: walking, cycling and public transport • Emissions to air and water • Noise and vibration.
Ensuring environmental sustainability	<ul style="list-style-type: none"> • Emissions to air and water • Use of non-renewable resources • Greenhouse gas emissions.
Supporting the growth strategy	<ul style="list-style-type: none"> • Relative accessibility to, within and between key growth centres • Growth centre community cohesion • Level of fixed public transport as a catalyst for centre growth.
Cost effectiveness	<ul style="list-style-type: none"> • PT cost per passenger km • TDM cost per vehicle trip removed • Roading indicative benefit/cost ratios.

Table 6.4: Summary of evaluation by objective

NOTE: Ticks and crosses reflect the extent to which the option results in an improvement in the objective between 2001 and 2016, based on an unweighted combination of individual criteria scores. 0 denotes no change from 2001, + denotes a "half tick", and - denotes a "half cross". For a more detailed discussion on the evaluation process, refer to Technical Paper 20

Objective	2001	Do Min.	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	HHH
Assisting economic development	0	X	0	0	0+	0	0+	0	✓
Assisting safety & security	0	X	0+	0+	0+	✓+	✓	✓+	✓+
Improving access and mobility	0	0	0+	✓+	✓+	✓+	✓✓	✓✓	✓✓+
Protecting & promoting public health	0	0	0	0	0+	0+	0+	✓	✓
Ensuring environmental sustainability	0	X-	XX	X-	X-	X-	X-	X	X-
Supporting the growth strategy	0	0	0+	✓	✓	✓+	✓+	✓✓	✓✓



Table 6.4 summarises the evaluation of strategic options against each of the Regional Land Transport Strategy's objectives¹⁰, using the criteria listed in Table 6.3. Technical Paper 20 contains a detailed discussion of the evaluation results.

The evaluation highlighted the following key points:

- Option 6 scored better than the other strategic options on all of the objectives, except for economic development
- Options 3 and 5 scored better than the other strategic options for economic development, but the difference between options is minimal. None of the options deliver significant improvement over 2001 for the economic development objective. Note also that the overall regional scores for economic development tend to obscure some variations in outcome at the sub-regional level
- None of the options showed an improvement over 2001 for the environmental sustainability objective. This was due to the increase in travel demand, with associated increases in fuel consumption, greenhouse gas emissions and emissions to water. These factors are not significantly influenced by the different transport systems developed for the strategic options, and are likely to be more sensitive to changes in external conditions such as vehicle technology, fuel prices, taxation, etc
- The strategic options perform better than the "do minimum" on all objectives (except for environmental sustainability). The "do minimum" does not lead to an improvement over 2001 conditions for any of the objectives
- Although it is not affordable within the assumed financial constraint of \$11 billion (including

the known additional funding). However implementation of the "high-high-high" (HHH) option would require an additional \$2.8 billion, but would generally result in better performance than any of the other strategic options, particularly for economic development. The only exception is for environmental sustainability, where the "high-high-high" option involves higher fuel use and emissions.

In addition to the evaluation reported above, an analysis of cost effectiveness and implementation risks was undertaken for each of the package elements that made up the strategic options.

The cost effectiveness assessment reviewed the incremental benefits that are expected from incremental increases in the level of activity, from the "low" to "medium" to "high" packages for public transport and travel demand management; and for progressive increases in roading activity. This analysis revealed generally reducing returns at the higher levels of investment, suggesting that the "high" packages are generally less cost effective than the "medium" packages.¹¹

The risk analysis focused on whether the benefits assumed in the evaluation would actually be delivered, and whether the costs of achieving those benefits may be greater than the amounts assumed in the evaluation¹². The analysis identified the following risks as having a high probability and a high impact:

- Cost increases (road, rail and bus priorities): this is a high risk for the high road, high public transport and medium public transport packages.
- Inability to deliver key projects (road, rail and bus priorities): this is a high risk for the high road and high public transport packages.
- Funding procedures, particularly the ability to fund local share: this is a high risk for the high public transport packages.

¹⁰ Details of the evaluation criteria and measures and assessment are contained within TS/05/TP14 and TS/05/TP20.

¹¹ For details of this analysis, refer to Technical Paper 24.

¹² This is reported in Technical Paper 28



- Skill shortages: this is a high risk for the high travel demand management packages.
- Overestimate of benefits: this is a high risk for the high travel demand management packages.

The conclusion from the risk analysis was that Option 6, with high public transport and high travel demand management, is the most risky of the strategic options. Options 1, 4 and 5 had moderate levels of overall risk, and Options 2 and 3 were assessed as the least risky.

The overall conclusion from the evaluation was that although Option 6 performed best on most of the parameters assessed, it also has some weaknesses. It is not the best option for economic development (it does not improve conditions from 2001); it involves investment in some projects that have lower cost effectiveness; and it is the most risky of the six strategic options.

The evaluation also illustrated the offsetting impacts of road, public transport and travel demand management expenditure in dealing with issues such as traffic congestion. The assessment of travel times suggests that options with high roading expenditure (but low public transport and travel demand management) will be no more effective in addressing congestion than those options with lower road expenditure but higher public transport and travel demand management. While increasing road expenditure can improve travel conditions, this will not be the case where investment is diverted away from public transport and/or travel demand management expenditure as a result. This result is reinforced by the assessment of the "high-high-high" option, which indicates significantly improved travel conditions through a high level of investment in all three elements.

It should also be noted that the evaluation has not considered the potential impact of road pricing. The government is currently reviewing the issue of road pricing. Until that review is complete, and the range of possible road pricing options understood, the inclusion of road pricing within the strategic options for the

Regional Land Transport Strategy is considered to be premature. It is intended, however, to incorporate the results of the government's review into the strategy once these are available, and when the feasible range of pricing options can be assessed.

6.4 AGREED STRATEGY

Taking into account the evaluation of strategic options summarised in the previous section, Option 5 has been identified as the agreed strategy for the region. The RLTC consulted on the draft strategy and all the options. At the conclusion of the process it was determined that Option 5 was the strategy which best met the RLTS objective. This section outlines the rationale for that choice.

The evaluation against the Regional Land Transport Strategy objectives highlighted a general increase in scores for most objectives with incremental improvements to public transport and travel demand management. From this, it was concluded that public transport and travel demand management need to be increased substantially from their current levels, and that expenditure should be at least at the medium package levels, and possibly higher.

Although the evaluation resulted in higher scores for Option 6 against most of the objectives, it was considered that Option 6 should not be selected as the preferred option. In particular it was noted that:

- Option 6 is the most risky of the strategic options
- Option 6 involves investment in some projects which have lower cost effectiveness
- Option 5 performs better than Option 6 for economic development
- It will not be possible to implement the high public transport and high travel demand management until near the end of the 10-year period, and for both elements the medium level of activity is a step on the path to the high level. This is because the high PT and TDM options first



depend on the completion of the medium TDM and PT options which will take some years to implement.

- Option 6 would not provide sufficient funds to complete a number of key roading projects
- Over 50% of the submissions received identified option 5 as their preferred option.

Weighing these factors up, it was considered that it is essential that the land transport strategy for the region commits to a substantial improvement in public transport performance. For this reason, the high public transport package was favoured.

It was also considered that a substantial increase in travel demand management activity is necessary. However, in this case, the medium package, which represents a four-fold increase in current activity, is a sufficiently strong increase at this stage. Implementation of the medium travel demand management package will allow for closer scrutiny of the effectiveness and risks of travel demand management investment in the next few years.

In choosing Option 5, the importance of continued progress towards completion of the strategic road network was recognised. The Regional Land Transport Strategy therefore provides for planning for all elements of the strategic road network to continue, and for some strategic investments to be made that will keep options open for longer-term development of the network.

The expected outcomes from implementation of the preferred strategic option are set out in Chapter 9. In some areas, these outcomes fall short of the desired outcomes that were established in Chapter 4. As noted above, this is due in part to the fact that the choice of option was constrained by the expected availability of funds, and by the decision not to include road pricing in the options. Evaluation of the “high-high-high” option shows that better outcomes could be delivered if the financial constraint was lifted, and the Regional Land Transport Strategy includes policies on this issue in Chapter 7.

Rising Oil Prices

While the agreed strategy best meets the objectives of the RLTS, it should be noted that none of the options considered were sustainable over the medium to long term. This is in large part due to reliance on non-renewable fossil fuels. Over time fossil fuels will become increasingly scarce, which is likely to encourage more efficient fuel use and development of alternative energy sources. This is acknowledged as an issue which is not resolved in this RLTS and needs to be more fully addressed in the next review of the strategy.

Recent increases in fuel prices highlight the issue. It is not clear at this point at what level prices will stabilise (or if they will stabilise at all), and what the short to medium term impacts on the transport system will be. Nonetheless the price rises illustrate the volatility of oil prices and the risks of relying heavily on one form of fuel.

Oil price rises could affect the transport system and land use in the following ways

- If the private vehicle fleet does not change, the average price of making a private vehicle trip will rise, resulting in a likely mode shift or a reduction in non essential trip making
- The increase in demand for motor vehicle use is likely to weaken and consequently congestion will be less than would otherwise be the case
- The fares and/or public transport subsidies on all petrol and diesel fuelled modes of public transport are likely to rise.
- Public transport use could increase beyond what is now projected
- Walking and cycling trips are likely to increase
- Long distance rail freight is likely to become more attractive than long distance road based freight



- Smaller engined cars, hybrid cars and two wheeled motorized transport are likely to be more popular, i.e. fuel efficiency measures and new technologies may be advanced
- Per km fuel consumption are likely to decrease along with vehicle related emissions
- Location decisions for both businesses and households may change, locations well serviced by public transport maybe favoured.
- The mobility of people without access to public transport services will be affected most, and this will generally impact more on people living in rural parts of the region, people on lower incomes or fixed incomes and people with disabilities.
- The level of funding for the Auckland transport system is likely to be affected as motorists respond to increasing prices by using less fuel, resulting in less fuel sales and therefore less fuel tax.

In addition to the impacts listed above there may be impacts on security of fuel supply. As worldwide demand increases relative to supply, disruptions to supply will have more immediate impacts. The capacity of the international oil industry to absorb disruptions in supply will reduce, and fuel prices may become more volatile. In light of the possibility that oil prices will continue to increase and/or there are restrictions on supply, the transport system needs to be flexible and resilient enough to still meet the objectives of this RLTS.

6.5 FUNDING AND IMPLEMENTATION

Implementation of the preferred strategic option will require funding to be allocated according to the

general levels identified in the preferred option. To achieve this, a set of funding allocation and implementation policies has been developed to address the following matters:

- Allocation of the available transport funding to provide for the implementation of the preferred strategic option (Option 5). This requires the following general allocations of funding over the next 10 years:

TRAVEL DEMAND MANAGEMENT 4%

PUBLIC TRANSPORT 34%

- Infrastructure 19%
- Services 16%

ROADS 62%

- Infrastructure 30%
- Safety measures 4%¹³
- Traffic management 2%¹⁴
- Maintenance & renewals 26%

- The need for implementation agencies and funding agencies to take these general allocations into account in preparing land transport programmes, and in exercising their respective roles and responsibilities
- The responsibility of Transit and Auckland Regional Transport Authority (ARTA) to determine the specific activities, projects and priorities within the general allocations, which will enable the expected outcomes to be achieved
- The need for funding shares between Land Transport NZ and local/regional sources to be aligned to ensure that funding policies do not act against the implementation of the preferred strategic option

¹³ For safety measures which are **additional** to those currently provided for by TNZ and the Regions' TA's

¹⁴ For traffic management measures that are **additional** to those currently provided for by TNZ and the Regions' TA's



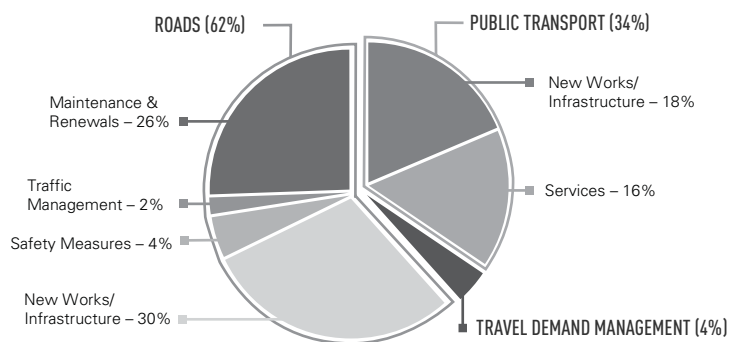


Figure 6.2 Allocation of the available transport funding to provide for the implementation of the preferred strategic option (Option 5)

- Advocacy for additional funds to deliver the improved outcomes associated with implementation of a “high-high-high” option
- Actions necessary to address the key risk areas associated with implementation of the preferred strategic option, including the need for careful management to ensure that increases in the demand for new works does not outstrip the capacity of the construction industry and other suppliers, or lead to unacceptable cost increases.

The policies to address these issues are set out in Chapter 7.



